



Caltrans Division of Research,
Innovation and System Information

Research Results

Transportation
Safety and
Mobility

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Project Title:

Crash Attenuator Data Collection
and Life-Cycle Tool Development

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Product Category: Processed data or
database

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Crash Attenuator Life-Cycle Costs

*Collecting data to assess the long-term cost-effectiveness of
different attenuators*

WHAT WAS THE NEED?

Crash attenuators prevent motorists from colliding with hazards in or near the roadway by encouraging drivers to decelerate or redirect the vehicle, reducing the risk to the occupants and other nearby vehicles. Crash attenuators offer different levels of performance and have a wide range of costs. Attenuators are designed to be hit, so repairs or removal must be considered as part of the overall cost. Repair costs fluctuate greatly based on the type of impact, the parts needed, and how accessible the location is. A cost is also associated with the need to control or limit traffic to complete the work. A new class of attenuators that are easier to reset in place cost more upfront, but are less expensive to maintain. The cost-benefit of these class attenuators is often overlooked because the focus is on the initial expense rather than long-term upkeep.

A better understanding of the life-cycle costs will help Caltrans determine the least expensive option over a period of time, reducing overall costs. This study was a continuation of the project *Crash Attenuator Usage Along Travelways and in Work Zones* during which a methodology was developed to appraise the annual maintenance costs based on the attenuator location, including labor, parts, and traffic control during repair. The software tool CAL-Cost was developed to populate life-cycle costs using existing data from Caltrans maintenance databases and district records. The severity of damage to an attenuator during a crash facilitates better understanding of long-term costs. However, it became apparent that there was a lack of existing data to work with. A strategy to collect crash attenuator data to develop a database was needed.

WHAT WAS OUR GOAL?

The goal was to devise a strategy to collect data from existing crash attenuators to develop a database to better determine life-cycle costs.



Video data collection system



Caltrans provides a safe, sustainable,
integrated and efficient transportation
system to enhance California's
economy and livability.

WHAT DID WE DO?

Caltrans, in partnership with the University of California, Davis Advanced Highway Maintenance and Construction Technology Research Center, configured a video camera system that was capable of recording crash attenuator activity. When the attenuator was hit, an installed accelerometer triggered the video camera to record. The data was automatically uploaded via a cellular modem and later analyzed. After meeting with a few districts and evaluating site locations, the researchers selected three crash attenuators to monitor as a test.

WHAT WAS THE OUTCOME?

The collected video data supplemented existing impact and repair data from the Caltrans maintenance database, which combined helped to populate the CAL-Cost decision-support tool. Engineers can evaluate different crash attenuator products per a specific site in terms of their life-cycle costs.



Video camera view

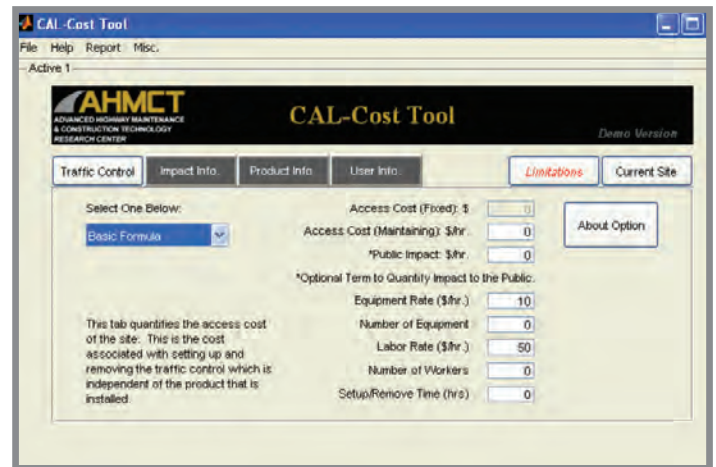
WHAT IS THE BENEFIT?

Because crash attenuators are designed to be hit, their in-service costs need be taken into consideration, in addition to their initial cost. Calculating the life-cycle cost of an attenuator prior to purchase can result in long-term cost savings. This data aids engineers in selecting the most cost-effective crash attenuator per location based on long-term costs, including traffic control, maintenance, and replacement parts.

LEARN MORE

To view the complete report:

<http://ahmct.ucdavis.edu/pdf/UCD-ARR-14-06-14-05.pdf>



CAL-Cost helps engineers evaluate the life-cycle costs of crash attenuator products for a specific site.